PTO 06-4188 German Patent Application No. 26 50 522

ARC WELDING MACHINE

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UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. MAY 2006
TRANSLATED BY THE MCELROY TRANSLATION COMPANY

FEDERAL REPUBLIC OF GERMANY
GERMAN PATENT OFFICE
PATENT APPLICATION 26 50 522 A1
(Offenlegungsschrift)

Int. Cl.[2]:	B 23 K 9/10
File No.:	P 26 50 522.6-34
Filing Date:	November 4, 1976
Disclosure Date:	May 11, 1978

ARC WELDING MACHINE

[Lichtbogenschweißmaschine]

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Examination request is filed according to § 28 of the Patent Law

Claims /1*

1. Arc welding machine, especially an inert gas welding machine, with a DC source, which produces a welding current at relatively low voltage, which can be transferred, by means of a transfer device, to the welding wire that burns up during welding, characterized by the fact that means (16, 19) to accommodate at least one battery (9) or (10) forming the DC source are provided.

2. Arc welding machine according to Claim 1, characterized by the fact that means (13) or (23) to connect several batteries (9, 10) in series are provided.

3. Arc welding machine according to Claim 2, characterized by the fact that two 12-volt batteries (9, 10) are connected in series.

4. Arc welding machine according to at least one of the preceding claims, characterized by the fact that the batteries (9, 10) to be connected in series can be coupled to each other by a quick-release closure (23, 24).

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* [Numbers in the margin indicate pagination of the original text.]

5. Arc welding machine according to at least one of the preceding claims, characterized by the fact that the batteries (9) and (10) can be releasably fastened in a housing (16) that /2
accommodates a wire advance device (3) and a wire storage drum (1).

6. Arc welding machine according to at least one of the preceding claims, characterized by the fact that the batteries (9) and (10) are arranged on a retractable table (19).

7. Arc welding machine according to at least one of the preceding claims, characterized by the fact that the batteries (9, 10) are arranged next to each other.

8. Arc welding machine according to one of the Claims 1 to 6, characterized by the fact that the batteries (9, 10) are arranged one above the other.

9. Arc welding machine according to at least one of the preceding claims, characterized by the fact that at least one storage battery (9) or (10) is provided as welding current battery.

10. Arc welding machine according to Claim 9, characterized by the fact that the storage battery (9, 10) is designed as a lead storage battery.

11. Arc welding machine according to at least one of the preceding claims, characterized by the fact that a connection (26) for a charging device is provided.

12. Arc welding machine according to at least one of the preceding claims, characterized by the fact that the wire advance device (3) has a DC motor (4) connectable to a battery.

13. Arc welding machine according to Claim 12, characterized by the fact that the DC /3
motor (4) of the wire advance device (3) can be connected to the welding current battery (9, 10).

14. Arc welding machine according to at least one of the preceding claims, characterized by the fact that a control device (6) connectable to the welding current battery (9, 10) is provided.

The invention concerns an arc welding machine, especially an inert gas welding machine, /4
with a DC source that produces a welding current of relatively low voltage, which can be transferred by means of a transfer device to the welding wire that burns off during welding.

In the known arrangements of this type, the welding current is generally taken from line voltage. The known arrangements are therefore equipped with a transformer for desired voltage reduction and with a rectifier to convert the line current to direct current. The cost connected with this, both with respect to producing this electrical equipment, and with respect to installation and wiring, is not insignificant, and is quite decisive in terms of purchase price. Another particular drawback of the known arrangements is seen in the fact that the line voltage connection required here restricts the possible action radius quite critically. Quite apart from this, /5
however, the connection cables employed are generally subjected to severe wear through damage and therefore represent a permanent source of hazard. In addition, the time required for laying and removal of a longer cable path is not insignificant. Arrangements of this type can therefore

be used economically only where permanent welding operations are desired. In particular, high overhead results with only sporadic demand.

With this as point of departure, the task of the present invention is to devise an arc welding machine of the generic type, avoiding the drawbacks of the known arrangement, which can be used independently of line voltage and therefore has a mobility not deemed possible thus far and, at the same time, results in excellent economic efficiency, both with respect to production costs and with respect to operating costs, especially with the consistently low demand.

The solution to this task is achieved in an arc welding machine of the type just mentioned in surprisingly simple fashion, in that means to accommodate at least one battery forming the DC source are provided. Since such elements furnish the desired direct current from the outset and can be easily designed for the relatively low voltage, both a transformer and a rectifier can be advantageously omitted here. In addition, the arrangement according to the invention also requires no further means to produce a line voltage connection. The expedients according to the /6
therefore not only have the desired cost-reducing effect, but, at the same time, also lead to a light- and space-saving arrangement. Since the arrangement according to the invention gets by advantageously without line voltage connection, so that no cable need be laid before starting the welding work and cleared away again after completion of work, a frequent change of location is fully non-problematic. Because of this, the downtimes are significantly reduced, so that the arrangement according to the invention can be used particularly economically anywhere that high downtime, in comparison with effective welding time, are a concern, for example, in auto repair shops, etc. The use readiness of the arrangement according to the invention is also advantageously not connected to the presence of a matching socket, so that the arrangement according to the invention can be easily used outdoors and in the field. This can be particularly time-saving, for example, during construction site use. The advantages attainable with the invention are therefore seen, in particular, in its economic efficiency and high mobility.

A particularly expedient embodiment of the invention can consist of the fact that means to connect several batteries in series are provided. This can be easily produced in time-saving and advantageous fashion by means of a quick-release closure.

According to another particularly advantageous embodiment of the invention, the mentioned batteries can be designed as rechargeable batteries, preferably lead rechargeable batteries of the type used as auto batteries. On the one hand, these elements are produced in large numbers because of their widespread use and are therefore relatively favorable. On the other hand, /7
charging with ordinary charging devices that are also widespread is also possible in simple fashion here. For example, the quick-release closure provided for coupling of the elements in series can be provided with a connection possibility for a charging device.

A preferred embodiment of the invention can also consist of the fact that the wire advance unit has a DC motor connectable to a battery, preferably a welding current battery. By this expedient, it is ensured that complete independence from line voltage is also achieved in this respect. By simultaneous removal of welding energy and advance energy from the same battery, an automatic adjustment of the advance speed to the welding current is also achieved. A control device is therefore unnecessary in many cases. However, if, for certain individual cases a control device is provided, this is also expediently fed by a battery.

Additional features and advantages of the invention are apparent from the following description of a practical example by means of the drawing in conjunction with the claims.

In the drawings:

Figure 1 shows a schematic view of the invention by means of a circuit diagram and

Figure 2 shows a view of a welding machine frame equipped according to the invention.

An inert gas welding unit forms the basis of the figures, which permits practically endless processing of a welding wire. A drum 1 is indicated in Figure 1, on which the welding wire 2 is wound, which is fed to a welding torch not further shown here. The welding wire advance is /8
produced by an advance unit, referred to overall as 3, which is equipped with two transport rolls 5 driven by a motor 4, which roll one on the other and carry along the welding wire 2 pulled between them by friction. To control the advance speed, a control device, indicated at 6, can be provided. To transfer the welding current to the welding wire 2, this is preferably passed through a contact device in the region of the welding torch, for example, a contact ring, etc. Such a device is indicated at 7 in Figure 1.

The contact device 7 is connected by means of a current feed line 8 to a battery station, which is to be formed here by two batteries 9 and 10, connected in series to increase the voltage. The required welding voltage then lies at about 15 to 20 volt. This voltage drop can be easily maintained at a no-load voltage of about 24 volt, so that two 12-volt batteries are fully sufficient to equip the battery station. Advantageously, normal auto batteries can be resorted to for this purpose, which, as is known, are designed as lead rechargeable batteries and therefore can be expediently recharged. As experiments have shown, the welding times attainable with a single charge for many applications, in which long-term welding operation does not matter, but for rapid sporadic use instead, are fully sufficient. Expediently, the drive motor 4 of the advance unit 3 is fed from the battery station according to the invention. For this purpose, a current feed line 11 is provided. By this expedient, automatic adjustment of the advance speed to the power /9
available for welding can be achieved, since, for example, the drive torque of motor 4, and therefore the wire advance speed, automatically declines with declining battery charge and therefore declining welding power. If, however, a control device 6 is provided for special cases, this is also expediently fed from the battery station. For this purpose, the current feed line 12 can

be provided. Naturally, it would also be conceivable, however, to provide the control device 6 with its own battery to supply the drive station 3. The batteries 9 and 10 are expediently connectable to each other by a quick-release closure. This is shown in Figure 1 by an insertable contact plate 13. For simplification of the wiring, the lines 8, 11 and 12 can be partly integrated in a circuit board indicated 14, connectable to the poles of battery 10.

In the particularly preferred practical example shown in Figure 2, the idea of the invention that can be deduced from Figure 1 is implemented. In the interest of simplicity, the same reference numbers are used for the same parts. Expediently, a trolley 16 mounted to move on rollers 15 is provided here, which has a connection bushing 17 for a cable duct 18, in which the welding wire 2 and all other lines for inert gas, cooling water, current, etc. leading to the welding torch are accommodated in protected fashion. In the lower area of trolley 16, the battery station according to the invention is accommodated. For this purpose, in a simple variant, a shelf provided with a corresponding bottom is sufficient, in which the batteries 9 and 10 can be inserted in preferably lockable fashion. In the depicted practical example, batteries 9 and 10 are secured on a retractable table 19, which is guided on rails 20. The table 19 can expediently be /10
provided with a handle 21. Tabs 22 are provided to hold the batteries 9 and 10, which limit a corresponding area of table 19, in which the batteries 9 and 10 can be inserted. The batteries 9 and 10 to be connected in series are coupled to each other through a mountable frame 23, which can be provided with corresponding receptacles 24 that can be mounted on poles of batteries 9 and 10, designed as pins. On this account, a secure and reliable quick-release closure is advantageously obtained. The frame 23 can be provided with a contact strip not further shown here, via which the desired power can be taken off. It would also be conceivable, however, to provide corresponding plug contacts in the area of frame 23, as shown in Figure 2 at 25. To guarantee simple recharging of batteries 9 and 10, the frame 23 can also be equipped with a connection possibility 26 for a charging device. The use of such a plug frame obviously permits a robust operating method and ensures simple operation. In a simple practical example, however, it would also be conceivable to connect batteries 9 and 10 by cable pieces provided with simple clamping screws, and to connect them to lines 8, 11 and 12.

A shelf covered by a flap 27 with a spindle 28 to accommodate a wire spool 1 is situated above the battery station. At limited distance, the advance unit 3 is mounted next to the spool 1, which feeds the welding wire 2 to a welding torch (not further shown) in known fashion via connection 17 and cable duct 18. The control device 6 can be accommodated here in a box flanged to the motor housing.

The batteries 9 and 10 can be arranged next to each other to achieve a relatively flat /11
layout, as shown in Figure 2. To achieve a relatively narrow design, the batteries 9 and 10, however, can also be mounted one on the other, as is apparent in Figure 1.

A particularly preferred practical example of the invention was further explained above, without, however, being bound to it as a restriction. Instead, a number of possibilities are available to one skilled in the art, in order to adapt the general idea of the invention to the conditions of an individual case. For example, instead of two batteries 9 and 10, fewer or more batteries of corresponding strength could also easily be provided.

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Fig 1

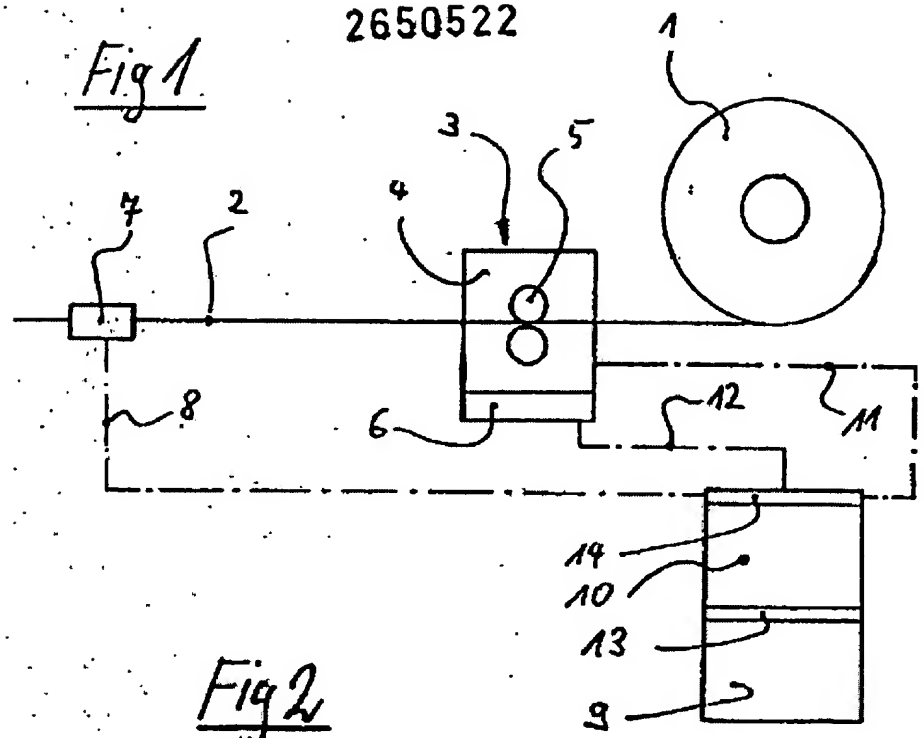

Fig 2